

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.**

In the Matter of)	
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Public Safety And Homeland Security)	PS Docket No. 06-229
Bureau Seeks Comment On The)	
Technical And Operational Feasibility)	
Of Enabling Flexible Use Of the 700 MHz)	
Public Safety Narrowband Allocations)	
And Guard Band For Broadband Services)	

COMMENTS BY THE STATE OF COLORADO, GOVERNOR'S OFFICE OF
INFORMATION TECHNOLOGY

The STATE OF COLORADO, Region 7, is a licensee of public safety 700 MHz spectrum and presently operates trunked repeater site infrastructure and trunked mobile radio equipment in this band under Federal Communications Commission authorization WPTZ761. As a licensee in this band and an operator of equipment, we offer the following comments to questions raised by the Commission in PS Docket No. 06-229 / DA 10-1877:

What is the current and anticipated use of 700 MHz narrowband networks?

State of Colorado participates in a multi jurisdictional shared 700 MHz/800 MHz Project 25 Digital Trunked Radio (DTR) statewide system. It currently consists of 198 active radio sites providing mobile radio coverage to an estimated 93 to 95% of the geographic area. The DTR system has approximately 1200 channels of which 156 are 700 MHz channels. Currently DTR serves over 1000 State, local, county, federal and tribal agencies consisting of over 55,000 subscriber radios. Many of these agencies utilize the 700 MHz channel sites in the heavily populated and frequency congested Front Range urban areas from Fort Collins south through Denver and Pueblo. Currently there are 20 sites with 700 MHz licensed State and General Use channels serving the Front Range area with more planned.

Increased use of 700 MHz narrowband voice spectrum will continue as 800 MHz spectrum becomes less available as public safety agencies migrate onto the statewide public safety 700 MHz/800 MHz Project 25 trunked system and require additional spectrum for new sites or additional capacity at existing sites.

Would the flexibility to offer broadband services in all or a portion of the 700 MHz narrowband spectrum and/or the guard band promote more efficient use of 700 MHz public safety spectrum?

The STATE OF COLORADO does not believe that the flexibility to offer broadband services in all or a portion of the 700 MHz narrowband spectrum and/or the guard band would promote more efficient use of 700 MHz public safety spectrum. Use

of the guard band, which exists for the sole purpose of mitigating interference issues, is not recommended. While it would be possible to utilize broadband in areas where there are no narrowband users, this would negatively impact the use of conventional and trunked interoperability channels. In the event of a catastrophe where broadband is utilized, the responding public safety agencies that have these channels pre-programmed in their radios today may not be able to use them as a result of broadband use in the area. Public safety has been granted these interoperability channels and has them programmed into their radios today. Relinquishing this capability to broadband would take a nationwide interoperability tool out of the hands of public safety.

Are there efficiency gains that could be realized by enabling this flexibility?

For the reasons mentioned in the response to the previous question, the STATE OF COLORADO does not believe that there are efficiency gains that could be realized by enabling this flexibility.

For example, could the use of the narrowband spectrum help satisfy needs for increased broadband capacity?

Relinquishing this spectrum to broadband would take a nationwide interoperability tool out of the hands of public safety and also place a stranglehold on public safety narrowband system capacity and coverage improvements in areas where 800 MHz spectrum is already congested.

Or could broadband spectrum help satisfy the needs for narrowband capacity over time?

It is possible that broadband technology may mature to the point where voice communications, which take place using narrowband technology today, could migrate to broadband. Our current assessment is that this could potentially take twenty years. However, the need for narrowband spectrum today is so great that the STATE OF COLORADO does not support committing valuable narrowband spectrum to broadband technology.

What would need to happen for this to occur?

In order for broadband to replace the narrowband systems used today, the technology must mature and become proven before public safety will place communications essential to their mission and safety into the hands of a new technology. If one uses the trunking technology now being deployed in public safety today as an example, it took nearly twenty years for it to be embraced, proven and mature enough that public safety began using it. Other technology, such as Project 25 digital voice, is following much of the same timeline. Our assessment is based on these examples.

If the Commission were to allow flexible use of 700 MHz narrowband spectrum and/or the guard band, would broadband operations in this spectrum potentially interfere with existing or future public safety narrowband operations?

The potential for interference with existing or future public safety narrowband operations from broadband operations in this spectrum is very real if the Commission were to allow flexible use of 700 MHz narrowband spectrum and/or the guard band. This would be particularly problematic in the border areas where broadband operation and narrowband operation meet. Additionally, capacity issues can arise from such flexible use of this spectrum because instead of having one narrowband frequency re-used, as is the case today, entire segments of the band would be unusable for large distances to protect from interference to and from the broadband operation. In Colorado, where 800 MHz spectrum is very congested and 700 MHz spectrum is required to add capacity to these systems, this would be very problematic and cause considerable concern for interference and our ability to increase the call-carrying capacity of the system.

We specifically seek technical information on the likely extent of such interference scenarios. What steps could be taken to mitigate such potential harm?

While the STATE OF COLORADO stands against the flexible use of 700 MHz spectrum for both narrowband and broadband operations, we feel that it is prudent to provide some input toward mitigating interference in the event that the Commission chooses to allow flexible operation. The geography of Colorado consists of mountainous terrain across approximately the western half of the state and high plains across approximately the eastern half of the state. The mountainous areas have peaks which reach 14,000 feet above sea level, while some areas of the plains are at a mere 3,500 feet above sea level. Such terrain causes interesting engineering problems when it comes to attempting to apply 'one size fits all' rules for spectrum re-use. Colorado has encountered this issue in licensing 800 MHz spectrum across the state, and feel that many of the same issues exist for 700 MHz spectrum licensing, and broadband co-existence in particular. Due to the varying terrain in Colorado, our recommendation for the mitigation of co-channel interference in any frequency band is much more conservative than current rules and would call for an engineering study of each co-channel licensee within 150 kilometers of the proposed station for the potential for base transmit interference as well as the potential for mobile transmitter/SU equipment interference in the area where a base station provides coverage. Providing the existing/incumbent base station additional protection than described in §90.621, possibly up to 22 dBμ (F50,10), would provide a more realistic coverage pattern of the base station transmitter, thus mitigating the potential for interference in areas where the coverage of narrowband and broadband technologies meet. A similar contour study of the base station receive footprint, possibly up to 22 dBμ (F50,10), would also provide a realistic view of where the base station receiver will be able to receive interference from mobile transmitters/SU equipment on another system. The intent of this is so that one technology does not roam into an area where the mobile transmitters/SU equipment which is communicating with a base station cannot unintentionally and consistently cause interference to an unintended destination base station receiver. Thus, a definition of a non-interfering system would be as follows:

The non-overlap of the proposed base station's 22 dBμ (F50,10) transmit interference contour with the existing base station's 22 dBμ (F50,10) transmit interference contour; the non-overlap of the proposed base station's 40 dBμ (F50,10) receive interference contour with the existing base station's location and the non-overlap of the existing base station's 22 dBμ (F50,10) receive interference contour with the proposed base station's location.

What impact would allowing flexible use of all or a portion of narrowband spectrum have on the continued ability to support nationwide narrowband interoperability?

The STATE OF COLORADO believes that there would be a negative impact to supporting nationwide narrowband interoperability by allowing flexible use of all or a portion of narrowband spectrum. In particular, allowing the use of the existing nationwide law enforcement, emergency medical service and fire service narrowband frequencies, which span nearly the entire band, would be of particular detriment. Currently, many agencies in Colorado have these frequencies programmed into their portable and mobile radio equipment, and taking this nationwide interoperability tool out of the hands of public safety first responders would certainly be a step backwards for what little nationwide narrowband interoperability we have today on any frequency band. There are additional nationwide interoperability frequencies, including a set which can be used for temporary trunking operation, which would also become unusable nationwide should flexible use of the narrowband spectrum be authorized. The STATE OF COLORADO is in the process of purchasing two mobile 'site on wheels' units and intend to use this set of nationwide narrowband trunking frequencies on both of them. These would no longer be deployable anywhere nationwide should flexible use of the narrowband spectrum be authorized. Finally, should all or large portions of the 700 MHz spectrum become unusable in areas of Colorado due to flexible use, this could impact the ability for additional agencies to become a part of the Colorado statewide 700 MHz/800 MHz Project 25 trunking system should 800 MHz spectrum be too congested to allow for the amount of capacity required for that agency to become a part of the system. This impacts interoperability because, as often demonstrated during large disasters as well as SAFECOM's interoperability continuum, a shared system is the highest level of interoperability.

How much, if any, of the narrowband allocation and guard band should be made available for broadband operations?

The STATE OF COLORADO does not support any of the narrowband allocation or guard band becoming available for broadband operations. Should all or large portions of the 700 MHz spectrum become unusable in areas of Colorado due to flexible or exclusive use, this could impact the ability for additional agencies to become a part of the Colorado statewide 700 MHz/800 MHz Project 25 trunking system should 800 MHz spectrum be too congested to allow for the amount of capacity required for that agency to become a part of the system. Use of the guard band, which exists for the sole purpose of mitigating interference issues, for broadband operations is not recommended.

Should some portion of this spectrum (e.g., the upper portion of the band furthest from the existing public safety broadband spectrum) continue to be reserved exclusively for narrowband operations?

The STATE OF COLORADO supports continuing to exclusively reserve the entire portion of this spectrum, including the upper portion of the band that the Commission believes is furthest from the existing public safety narrowband spectrum, for narrowband operations. Today, the STATE OF COLORADO is operating on, or has immediate plans to operate on, narrowband frequencies which span nearly the entire

band. The lowest frequency in use is 769.15625 MHz / 799.15625 MHz and the highest frequency in use is 774.80625 MHz / 804.80625 MHz. Other agencies in Colorado whom are licensed for spectrum also span nearly the entire band as well with Arapahoe County, Colorado licensed for 769.25625 MHz / 799.25625 MHz on license WQLK818 and the Regional Transportation District licensed for 774.90625 MHz / 804.90625 MHz on license WQLZ331. Clearly, allocating any portion of this band exclusively to broadband operation would conflict with narrowband operations in Colorado.

If flexibility in the narrowband spectrum were allowed, what role should the 700 MHz RPCs and the states play in its implementation?

If flexibility in the narrowband spectrum were allowed, the STATE OF COLORADO believes that the 700 MHz regional planning committees (RPCs) should play a key role in its' implementation, including the election as to whether flexibility will be used at all on the spectrum under the control of that RPC in the region. Additionally, close coordination will need to take place with bordering RPCs so that interference issues can be mitigated between the regions should conflicts in use (e.g. narrowband vs. broadband) arise.

The STATE OF COLORADO submits that, should the Commission choose to allow flexibility in the narrowband spectrum, should broadband operation be elected for use in a region which shares a border with another region where narrowband operation on the same frequencies has been chosen, any broadband base station's 22 dBμ (F50,10) transmit interference contour shall not come within 10 kilometers of the regional border between those regions in order to preserve the availability of narrowband spectrum in the adjacent region. Additionally, broadband systems should be considered secondary if placed within 56 kilometers of a regional border and the broadband operation must accept any interference from narrowband operation in the adjacent region.

What would be the impact of allowing flexibility on the development of broadband, narrowband, and dual-use equipment in the 700 MHz public safety spectrum?

The STATE OF COLORADO believes that there could potentially be a negative impact on the development of narrowband equipment in the 700 MHz public safety spectrum should flexibility be allowed. We believe that the availability of the 700 MHz spectrum, which currently totals twelve megahertz (6 MHz by 6 MHz) nationwide, is allowing manufacturers to justify the development and continued availability of quality, narrowband equipment in the 700 MHz public safety spectrum. For many years, no manufacturers were selling 700 MHz narrowband equipment, and in the past five years, we have had at least five manufacturers enter into the market with good quality 700 MHz narrowband equipment. Should flexibility in the band be allowed, this will potentially shrink the area where this equipment can be used by a significant amount. The impact could be a limited amount of competition in the marketplace due to a shrinking availability of agencies that can use the narrowband equipment. This could also cause the cost of 700 MHz narrowband equipment to rise because the low demand could result in a lower return for the manufacturers.

If the Commission were to permit flexible use of the narrowband spectrum, what if any impact should this have on the existing rules that require 700 MHz narrowband systems to narrowband to 6.25 kHz bandwidth channels by December 31, 2016?

The STATE OF COLORADO does not find any reason that the flexible use of narrowband spectrum would impact the existing rules that require 700 MHz narrowband systems to narrowband to 6.25 kHz bandwidth channels by December 31, 2016.

Should the Commission reconsider this requirement?

The STATE OF COLORADO believes that the Commission should reconsider this requirement for a variety of reasons. In particular, the 700 MHz spectrum in most areas is not congested and thus does not justify the public interest for the investment in portable/mobile equipment as well as base infrastructure which will support 6.25 kHz bandwidth channels by December 31, 2016. It is the opinion of the STATE OF COLORADO that either the Commission should reconsider this requirement altogether, or place the decision as to what date, if ever, 700 MHz narrowband systems must narrowband to 6.25 kHz bandwidth channels into the hands of the 700 MHz regional planning committees (RPCs). With the decision for 700 MHz narrowbanding in the hands of the RPCs, narrowbanding can be completed over time and as spectrum conditions in the region warrant.

Would public safety resources be better spent transitioning 700 MHz narrowband operations onto a broadband platform?

Instead of narrowbanding, public safety resources would be better spent transitioning 700 MHz narrowband operations onto a broadband platform. However, the STATE OF COLORADO believes that the transition of narrowband operations to broadband technology may take at least fifteen years. The technology for broadband voice is not on the street today, therefore is not proven and not accepted by the public safety community for mission-critical voice communications. Until broadband technology is tested, proven and embraced, public safety will not place this important tool into the hands of this technology.

Respectfully submitted this 30th day of November, 2010

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